THE FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

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Officers: President, **Bill Warren:** (770)229-6108, warren7804@bellsouth.net; Vice President, **Larry Higgins;** Secretary-Treasurer, **Steve Bentley**.

Board of Directors: **Dwight Harness; Tom Danei;** and **Felix Luciano.**

Alcor/Webmaster, **Tom Moore;** Ga. Sky View Coordinator, **Steve Bentley;** Observing Coordinator, **Dwight Harness;** NASA Contact, **Felix Luciano;** Scouting Coordinator: **Steve Knight;** Event Photographer, **Tom Danei;** and Newsletter Editor, **Bill Warren.**

Club mailing address: 1212 Everee Inn Rd., Griffin, GA 30224. Web page: www.flintriverastronomy.org.

Please notify **Bill Warren** if you have a change of home address, telephone no. or e-mail address.

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Club Calendar. Fri.-Sat., Jan. 7-8: Cox Field observing (at dark); **Thurs., Jan. 13:** FRAC meeting (7:30 p.m., Rm. 305 in the Flint Bldg., UGa-Griffin campus).

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President's Message. As your president, I'm guardian of (and responsible for) FRAC's wellbeing. But I'm not working alone. Far from it. **Larry Higgins** and **Steve Bentley** have served as your vice president and secretary/treasurer, respectively, for three years now. To whatever extent you're happy with the direction our club is heading, it's due in no small part to those gentlemen and their hard work and unswerving support. Both of them have agreed to run with me for a fourth term as your officers; we'll see at our Feb. election meeting if you're satisfied with the job we've done.

Less heralded (because they aren't directly involved in the club's day-to-day operation) but equally valuable are our Board of Directors, whose primary responsibilities under the Bylaws are oversight of the presidency and Ga. Sky View.

We're losing three Board members in 2011: **Joel Simmons, Felix Luciano** and **Tom Danei.** Joel resigned his post shortly after last year's election, and Felix and Tom have been on the board for several years. Three finer gentlemen you're not likely to meet. Thanks, guys, for your ongoing support and work on FRAC's behalf.

To replace them, here's a slate of nominees that will, if elected – or re-elected, in two instances – work together as smoothly as the gears on an Olympic racing bicycle:

***Dwight Harness,** a returning board member, is already serving as FRAC's observing chairman. Dwight is definitely officer material somewhere down the line in FRAC's future.

***Tom Moore** served on the board from 2007-09. He is FRAC's Alcor (A. L. correspondent), and for several years he served as club librarian until space limitations and a change in meeting site venue forced us to dissolve our collection. As webmaster, Tom has transformed our website into a truly first-rate arm of the club. If we gave MVP awards for service to FRAC, Tom Moore would be an annual contender for the prize.

*As befits a minister, **Jessie Dasher** is friendly, outgoing, likeable and dependable. Although a relative newcomer to astronomy and FRAC, Jessie's dynamic, winning personality and willingness to pitch in without being asked whenever there's work to be done made him an obvious and deserving candidate for the board in 2011. (For more about Jessie, see p. 4.)

*The mysterious Nazca Lines in the Atacama Desert in Peru are one of mankind's unexplained enigmas. Another mystery closer to home is why

long-time FRAC member **Mike Stuart** has never before been asked to serve as an officer or board member. Mike is well-liked and respected by everyone in the club. An excellent observer who has earned four A. L. observing pins, Mike probably has spent nearly as much time at Cox Field over the years as anyone in the club except me. Like Dwight, Jessie and Tom, Mike is an excellent – and obvious – choice for board nomination in 2011.

So there you have it: our official nominees for next year's officers and board: President, **Bill Warren;** Vice President, **Larry Higgins;** Secretary-Treasurer, **Steve Bentley;** and Board of Directors, **Dwight Harness, Tom Moore, Jessie Dasher** and **Mike Stuart.**

Some final thoughts about the elections: You can either nominate yourself for office, or have someone else nominate you. All you need is someone to second your nomination. Voting is restricted to members present at the Feb. meeting. Every membership unit – individual or family – is allowed one vote.

Finally, I know you'll want to join me in welcoming our newest members: **Rick Staylor,** an immensely likeable guy who lives in Perry, Ga.; and Griffinites **Julie Avery** and **Sam Harrell,** her son. We met all of them at our Nov. UGa-Griffin lunar observing, and all of them attended our Christmas dinner party. Folks, please let us know what we can do to make your make your membership everything that you'd like for it to be.

-Bill Warren

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Last Month's Meeting/Activities. We had four members at Cox Field on Fri., Dec. 3rd – but not at the same time. **Larry Higgins,** newcomer **Rick Staylor** and **yrs. truly** arrived at 5:30 p.m. and stayed till 9:30. After we left, **Steve Knight** arrived and wondered where everyone was. It was the same thing we had wondered earlier. The sky was clear as a mountain pool, with transparency hovering around 6. The seeing wasn't nearly as good as we expected – **Jupiter's** equatorial belts and zones came and went like first-round contestants on "American Idol" -- but it was a beautiful night for observing anyway.

We had a splendid crowd of **32** at our Christmas Dinner Party at Ryan's on Dec. 10th. Attendees included: **Bagitta & Chris Smallwood; Mike Stuart; Betty & Steve Bentley** and their grandkids, **Brianna & Erin Mills**; **Linda & Larry Higgins; Tom Danei; Angela & Steve Knight; Ronny & Jessie Dasher; Rick Staylor; Dan Pillatzki; Dr. Richard Schmude; Cynthia Armstrong; Charles Turner; Roger Brackett; Laura, Elizabeth & Dwight Harness; Mason & Erik Erikson; Julie Avery &** her son, **Sam Harrell; Felix Luciano; Maria & Art Zorka;** and **yr. editor** and **Louise Warren.** Dan P. won the grand prize, the $99.95 Orion Telescope Accessory Kit. In all, we gave out 23 prizes worth $529.67, and by all accounts everyone had a great time.

You can see photos taken at the party by **Tom Danei** on fracgroups or frac-a.

Okay, so who braved the sub-20° temps to go out and look for **Geminid** meteors in mid-Dec.? **Yr. editor** went out from 3:18-3:27 a.m. on Dec. 14th and saw two meteors, one bright and one faint. (It was easy to tell they were Geminids, because *Gemini* was almost directly overhead and both meteors were moving away from the radiant (apparent point of origin) in that constellation.

Other observers included: **Tom Danei, Rick Staylor, Jessie Dasher, Dwight Harness** and **Steve Bentley.**

Tom sent out via e-mail a photo he took of a Geminid meteor at 3 a.m.

Rick: "I looked out the window (LOL)."

Jessie: "I was cold and tired. Stayed out from 11-11:30 p.m.. Saw five."

Dwight: "Looked for a few minutes at 11 p.m. They were very fast and bright. It was colder than a well digger's @#$%&! on a frosty morning."

Steve: "At about 11:30 p.m., I was outside for about 2 minutes and saw 4 meteors. They seemed to be coming straight in as there were no long tails on them. I would have stayed out longer, but the dog was finished. I could handle the cold, but the wind was terrible. I wanted to stay, but it wasn't worth it."

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This 'n That. Our collective thoughts and prayers are with the family of **Carlos & Olga Flores,** whose daughter, **Debbie Narvaez Flores,** is missing. Debbie, a professional dancer and showgirl in Las Vegas, vanished without a trace on Dec. 11th. Her car was later found with her purse inside. The investigation into her disappearance is ongoing.

We love you, Carlos, and pray for Debbie's speedy, healthy and safe return.

-Your friends in FRAC

*****Don't even think of trying to convince us of how busy and overworked you were in 2010.

You wanta talk busy? Consider **Stephen Ramsden.** Besides working as an air traffic controller (which isn't exactly a laid-back, stress-free occupation anyway), Stephen participates in a program in which he switches work hours with other controllers in order to permit him to go out to schools and elsewhere during the daylight hours to show and tell people about the Sun**.**

In 2010, Stephen conducted **72** public observings for no less than **60,000** people. Considering that his setup-takedown time for each event is 90 min. to two hours, Stephen devoted somewhere between 108-144 hours – that's the equivalent of **4-1/2 to six days**, folks! – just to setting up and taking down his array of solar 'scopes in 2010.

And oh, by the way: since he never conducts observings or solar presentations of less than two hours' duration, that's another 144+ hours, which means that **last year Stephen spent the equivalent of at least a week and a half to two weeks of his life doing nothing but conducting solar observings!** (Actually, the figure is considerably higher than that, since many of his observings were longer than two hours -- some of them were half-day or full-day affairs -- and we didn't include his travel time to and from those 72 events, either.)

Finally, we should point out that he did all that at no expense to anyone but himself. There were no appearance fees, travel remunerations or meal allowances. Late in the year, Stephen hurt his back but kept on going because, in his words, "Taking it easy is not part of my vocabulary."

Still…We're sure Stephen would understand and agree with writer **James Barrie's** *(Peter Pan)* statement that "It's not work unless you'd rather be doing something else."

*****From **Bob Gent's** article, "Farewell to Jack Horkheimer," in the Dec. 2010 issue of the *Reflector:* "For twelve years, Jack Horkheimer's awards helped many young astronomers to follow their passion for astronomy. **Katie Moore** won the award in 2000, and she said 'Mr. Horkheimer was an inspiration for me.' After completing her degree, she is now the Public Observatory Project Coordinator at the National Air and Space Museum in Washington, D. C."

*Every time we're tempted to conclude that, in astronomy, things cannot possibly get any weirder, we're reminded of the words of the British biologist **J. B. S. Haldane:** "Not only is the Universe queerer than we imagine, it is queerer than we *can* imagine."

Case in point: Astronomers recently identified an "ice volcano" on **Saturn's** largest moon, **Titan.**

The volcano, named **Sotra,** is 3,000 ft. high and 1,000 ft. deep. It's called a *cryovolcano,* or ice volcano, because it once had (and may still have) lava flows of molten ice.

Say what?

Molten ice? Isn't that a contradiction in terms?

Well…in a word, *No.*

On Earth, we have volcanic flows of molten lava flowing upward from the Earth's mantle in places like Hawaii and elsewhere. On Titan, however, beneath the surface lies a layer of ice, not rocks. So if Titan contains internal heat as our **Moon** once did, the volcanic lava consists of melting ice flowing to the surface.

Live and learn, we suppose…

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Upcoming Meetings/Activities. Our Cox Field observings will be on **Fri.-Sat., Jan. 7th-8th.**

Our FRAC meeting will be at 7:30 p.m. on **Thurs., Jan. 13th** in Rm. 305 of the Flint Bldg. on the UGa-Griffin campus.

Due to cold weather that would diminish crowds and a changing lunar cycle that would necessitate rather dramatic changes in our UGa-Griffin observing dates, we'll resume our UGa-Griffin lunar observings in March.

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People You Should Know: Jessie Dasher. A nominee for FRAC's Board of Directors in 2011, Jessie is a treasure to all who know him. As a minister, Jessie has, like a good gardener and shepherd, tended his phlox at Rehoboth Baptist Church for the past 7+ years.

Jessie's wit and humor are quickly becoming legendary in FRAC. For example, when asked, "What should your friends in FRAC know about you?," he replied, "I have three main subjects that I love to talk about: the Bible, computers and astronomy. I can bore you to death with any of those subjects!"

Jessie "observes whenever I can find the time to." He likes to tinker with telescopes: he converted a 3-in. Meade refractor – his first telescope – from an altazimuth mount to an equatorial mount. Then, with his next 'scope (a 5-in. Bushness reflector), he reversed the process and converted its equatorial mount to a home-made Dobsonian mount.

Says Jessie, "I've studied astronomy enough to know that there's a lot that I don't understand. I still get amazed just thinking about how telescopes work. To me, the universe is this magnificent creation that God has given to us to enjoy and study."

Jessie and his wife **Ronny** have two teenage children, **Brianna** (18) and **Alexander,** who is 15.

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IMAGING THE LUNAR ECLIPSE

observing report and photos by Katie Moore

(*Editor's Note: This observing report was published by The National Air and Space Museum on December 21, 2010 in Astronomy, Education and Space.)*

I was pleasantly surprised when the clouds rolled out and the weather turned out to be favorable for the total lunar eclipse last night! After work, I went home for a quick nap and put on layers and layers of clothing to help me brave the cold on the eve of the winter solstice. Friends and coworkers told me I was crazy to come back to work at midnight for the eclipse, especially with the temperatures predicted to be in the 20s. But the clear skies, which have been hard to come by so far this month, were more than this astronomy educator could resist.

So I met fellow astronomy educator Erin Braswell at National Air and Space Museum's Public Observatory at 1 a.m. to begin preparations for a night of observing and imaging the lunar eclipse. Our goal was twofold: to experience the eclipse for ourselves, and to capture it to share with our colleagues and visitors.

The 16-inch Boller and Chivens which is the main telescope at the Public Observatory, is a very high-powered telescope, great for seeing the tiny details of the Moon's craters and other features. However, it magnifies too much to see the entire Moon in one shot so isn't a great choice for eclipse viewing or imaging. Instead, we used the Public Observatory's TeleVue-85 refracting telescope along with a Lumenera 2-0 color camera and a Lumenera 2-2 monochromatic camera.

Lunar eclipse seen from The National Air and Space Museum's Public Observatory on the morning of December 21, 2010. Photos by Erin Braswell and Katie Moore.

The photograph, above, will give you a quick snapshot of our experience. If you observed the eclipse, you might notice that the photo does not do it justice. The human eye is much more capable of seeing a range of details and colors on the bright and

the eclipsed portions of the Moon, while the camera can only detect one part at a time. In reality, the "dark" portion of the Moon is still easily visible to the naked eye, although noticeably fainter than normal. Our cameras only capture the brighter, uneclipsed portions of the Moon during the partial phases. During totality, they capture the fainter, eclipsed Moon. In addition, the color is more vivid to the naked eye, during totality.

As predicted, during totality, the Moon was not uniform in brightness – it was slightly dimmer at the bottom, which was closer to the center of the Earth's shadow. Also, since the Moon didn't pass through the middle of the Earth's umbra, the eclipse doesn't progress straight across the Moon.

The things I most enjoy about lunar eclipses are seeing such a familiar object as the Moon take on an unusual appearance, and thinking about how our closest celestial neighbors are arranged to make it happen. The Sun's rays usually illuminate the Moon directly, but during a lunar eclipse, the Earth gets in the way. This causes the partial stages of the eclipse. Here you can rediscover that the Earth is a spherical object when watching the curved shadow of the Earth moving across the Moon! Then, during totality, the Moon is illuminated by sunlight that seeps through the Earth's atmosphere, giving it the fainter, reddish glow. You can almost feel the heavens line up!

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The Trivia Question That Grew: Part II

by Bill Warren

(Recap of Part I: *The* ***Sun*** *formed out of nebular gases (mostly hydrogen) from a supernova explosion. The planets, leftovers from the process that created the Sun, grew large enough through collisions over countless eons to clear their areas of other large debris except their moons. The planets' metallic cores, rocky exteriors and orbital velocities were sufficient to permit them to establish stable orbits around the Sun.*

Such was not the case with the lighter gases. They were either drawn into the Sun, or else blown away from it by the fierce solar heat. While a certain amount of atmospheric gases were captured by the inner planets, the outer planets, lying farther from the Sun, were far more successful in attracting and trapping those escaping gases, transforming them into "gas giants.")

Asteroids, Meteors and NEOs, Oh My! In addition to the planets and their moons, a lot of heavy carbon-, silicon- and metallic-based material exists in our Solar System. Much of it lies in an area between the orbits of **Mars** and **Jupiter** called the *asteroid belt.* While it's tempting to define **asteroids** as objects lying within that belt, such a definition is too limited to be useful. For one thing, some asteroids have been found in solar orbits outside the asteroid belt. For another, no one has ever established lower limits for asteroid size.

Every time asteroids (or any other rocky or metallic objects) collide, debris is (and has been) created. Some of it is large, and some of it small. Are those smaller particles, which extend down to the size of dust, asteroids? Or are they meteors? Who knows? And who cares?

Certainly the International Astronomical Union (IAU) doesn't.

What the IAU *does* care about are the objects floating around out there in the Solar System that are (a) large enough to identify or track in space, or (b) close enough to cause significant damage to the Earth if, for whatever reason, they stray into our path. As of May, 2010, astronomers had identified nearly half a million objects in category (a), including 7,035 "Near Earth Objects" (NEOs, including 84 comets and 6,991 asteroids) with orbits that bring them within 120 million miles of the Earth.

A few of the objects in category (b) are called Potentially Hazardous Objects, or PHOs. They include objects 50 yd. in dia. or larger with orbits that bring them within 4.65 million mi. of the Earth. As of May, 2010, 290 PHOs had been identified.

That's not to say, of course, that smaller objects could not damage the Earth. Our planet is constantly bombarded with debris from the Solar System. But

most of the debris is exceedingly small. Most of the meteors we see darting across the sky at night burn up in the atmosphere before they ever reach Earth's surface.

There are two ways we can proceed from here. We can either define a **meteor** as "a small asteroid," or define an **asteroid** as "a large meteor." Take your pick. Either way, we're talking about rocky or metallic objects whose surface material never evaporates from exposure to the Sun.

Okay, so we have the Sun, planets, moons, dwarf planets (e.g., **Ceres**), asteroids and meteors. So what else is out there?

Bearing in mind that there are precious few universal truths or laws governing astronomy for which there are no exceptions, the answer is: *comets*.

Comets. Comets are irregular lumps of ice containing rocky dust particles – "dirty snowballs," as astronomer **Fred Whipple** referred to them. Their ices are frozen water, carbon dioxide and other gases that evaporate in the presence of heat. They are leftovers from the formation of the Solar System 4.6 billion years ago.

Stars produce and emit heat. Lots of it. In the Solar System, the farther you travel away from the Sun, the colder it gets. In the same way that rocky and metallic material coalesced to become the planets, moons, etc., some of the gases and dust that escaped the Sun's and planets' gravitational attraction coalesced farther out (i.e., roughly beyond **Neptune)** to become comets.

Pluto, until 2006 classified as a planet, is now a dwarf planet. Some astronomers have theorized that Pluto might have been a moon of Neptune that managed to shake free and establish its own independent solar orbit. Others consider it to be a large comet. Current thinking favors the latter viewpoint, since Pluto resides within a distant belt of icy objects known collectively as the **Kuiper** (KYE purr) **Belt**.

(Note: The gas giants – Jupiter**, Saturn, Uranus** and Neptune – are composed primarily of gases surrounding their relatively tiny inner metallic cores. In that sense, at least, they too might be considered cometary except that they were large enough to develop spherical shapes and their gases are not frozen in place because they generate internal heat.)

The Kuiper Belt. *First, another aside: one astronomical unit (a.u.) equals 93 million miles, or the distance from the Sun to the Earth. The term* a.u. *is used to reduce the number of zeros when talking about distances in the Solar System, the same way that light-years (l.y.) make distances between stars more manageable.*

So where did the dust and gases go that wasn't captured by the planets?

Much of it resides in an area of space extending from 30 a.u. (the orbit of **Neptune**) to 55 a.u. from the Sun. It's the Kuiper Belt**,** a doughnut-shaped disk containing a total mass of $1/10^{th}$ that of the Earth. The Kuiper Belt is approximately 15 times farther out from the Sun than the asteroid belt is. It is also 20 times wider and 20-200 times more massive than the asteroid belt.

The Kuiper Belt consists mainly of relatively small, icy, comet-like objects (KBOs). Many of the larger KBOs (including Pluto) have satellites orbiting them, and at least three others -- **Eris, Haumea** and **Makemake –** are large enough to qualify as dwarf planets. An area at the outer periphery of the Kuiper Belt known as the **scattered disk** is thought to be where short-term comets – those with orbits lasting less than 200 years – come from.

The Kuiper Belt was named for the Dutch astronomer **Gerard Kuiper,** who was one of the first astronomers to speculate on the possible existence of such objects orbiting the Sun beyond the planets. There are thought to be hundreds of thousands of KBOs larger than 62 mi. in dia., and a trillion or more smaller icy bodies.

(Next month: Part III, "Cleaning Up the Debris: Further Thoughts on the Solar System.)

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